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09/766,069	01/19/2001	James R. Kahn	353-05	8301

7590

02/26/2003

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EXAMINER

MERCADO, JULIAN A

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/766,069

Applicant(s)

KAHN ET AL.

Examiner

Julian A. Mercado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Remarks

This Office Action is responsive to applicant's amendment filed December 4, 2002.

The rejection of claims 4-13 and 16 under 35 U.S.C. 112, second paragraph has been withdrawn.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-3, 9 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar et al. (U.S. Pat. 4,376,688) in view of Fu et al. (U.S. Pat. 5,914,018) and as evidenced by King (U.S. Pat. 4,108,751)

Claims 4, 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar et al. in view of Fu et al. and as evidenced by King as applied to claims 1-3, 9 and 14-16 above, and further in view of Pinarbasi. (U.S. Pat. 5,492,605)

Claims 6, 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3, 9 and 14-16 above, and further in view of Quazi. (U.S. Pat. 4,693,805).

Claims 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3, 9 and 14-16 above, and further in view of Arnold et al. (U.S. Pat. 5,423,971)

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3, 9, and 14-16 above, and further in view of Ion Beam Neutralization (Commonwealth Scientific Corporation).

The above rejections have been discussed in detail in the previous Office Action. The examiner notes that applicant's amendment to the present claims appear to have been submitted solely to obviate the ground of rejection under 35 U.S.C. 112, second paragraph. The scope of the present claims are substantially similar if not identical to those considered in the previous Office Action. Thus, the prior art rejections are maintained for the reasons of record.

Response to Arguments

Applicant's arguments filed with the present amendment have been fully considered but they are not persuasive, and the examiner's response thereto here follows.

Applicant submits that in alleged contrast to Fu et al., the shaping of the target is for controlling the trajectories emitted from the target surface. While Fu et al. is reasonably expected to perform to substantially the same extent, absent of unexpected results, by virtue of the concave and convex shape of the target surface, arguments drawn to "controlling the trajectories" are not persuasive as such limitations are outside the scope of the present claims.

Applicant submits that Pinarbasi does not suggest the use of a magnetic field in front of a target for containing secondary electrons, however, the exact positional relationship of the magnetic field to the target (in this case, arguably "in front of the target") is not persuasive as the claims merely recite the magnetic field to be "near said sputter target". Notwithstanding, it is

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known in the art that magnetic field lines extend infinitely into space albeit at decreasing magnetic field strength, thus, the magnetic field shown in Pinarbasi would naturally result to have magnetic field lines in front of the sputter target.

The examiner notes that arguments against Quazi, Arnold et al. and the *Ion Beam Neutralization* technical disclosure appear to be directed solely to these references failing to remedy alleged differences between Ceasar et al. and the presently claimed invention. However, Ceasar et al. in view of Fu et al. and as evidenced by King is maintained for the reasons of record and the combined teachings are believed to teach or at least suggest the presently claimed invention, thereby negating any alleged differences.

Response to Arguments in the Declaration

Each of applicant's salient arguments in the declaration has been carefully considered. As a matter of clarification, items 1-3(a), 4 and 5 appear to be arguments directed to the examiner's rejection of claims 4-13 and 16 under 35 U.S.C. 112, second paragraph (now withdrawn).

Item 3(b) of the declaration submits that the examiner has concluded that it would be obvious to use a curved target surface to control the trajectories of secondary electrons (not mentioned in Fu) in an apparatus where the ions are generated in a separate volume at higher pressure. [emphasis in original] In reply, it is unclear to the examiner as to why applicant believes that the examiner has come to this alleged conclusion, especially in view of the parenthetical pointing out that Fu also does not mention this feature. The only conclusion that

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the examiner has taken, as detailed in the prior Office Action, is that a curved target surface allows for more uniform sputtering. (see prior Office Action, page 6)

Items 6-7 submit that in Ceasar, the use of a shield and a collimated beam avoids contamination in the resulting deposited film, while in applicant's claimed invention these structural features are not necessary. However, the claimed invention is not found to preclude use of a collimated beam or shield. Additionally, Ceasar's teaching of a collimated beam and/or shield is disclosed so as to obtain "optimum results", and in this regard the examiner finds use of these features far from being immediately necessary. As to applicant's claimed ion beam energy of 50 eV or less obviating use of a shield or collimated beam, no comparative evidence is present in the file to conclusively determine that an energy beam at this level would result in avoiding of contamination without use of a shield and collimated beam.

Item 8 (a-c) submits that in view of the AIAA Journal, Vol. 15 and the text *Thin Film Processes* the energy levels in Ceasar contradict anything near 0 eV, and further reading of this section appears to submit that Ceasar is replete with "mistakes" and overall "sloppiness", with "spurious and false number[s]" and "obviously wrong" and that in view thereof, the examiner "has capriciously chosen a number that is wrong". In reply, applicant is reminded that all patents are presumed valid (35 U.S.C. 282), and while Ceasar may express a preference for a bias voltage of 500 eV within the broader disclosed range of 0 to about 2000 eV, the combined teachings of Ceasar as evidenced by King (which, incidentally, is part of the basis for rejection) provides motivation for the skilled artisan to focus on bias voltages lower than the exemplary "preferred" range in Ceasar and to further explore bias voltages below that range without undue experimentation. As detailed in previous Office Actions, King teaches that 20-30 eV is the

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threshold for the onset of sputtering to occur, thus, any energies of higher value would naturally result in a correlative increase in sputtering. Ergo, absent of unexpected results, optimization of the bias voltage starting from the value recognized as the onset of the correlative result (20-30 eV) is result-effective. *In re Boesh*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) The AIAA Journal, in fact, discloses that “specific applications can require a range of ion energies” while “lower ion energies can be useful as final machining step to reduce surface damage”. (see section II. Ion Source Design) The teachings of King cannot be ignored, and while addressed by applicant in Item 11 of the declaration, the King reference is precisely the “substantive reference” relied upon by the examiner to show “an energy even approaching 50 eV”, contrary to applicant’s allegation that this feature is otherwise unfounded.

As to applicant stating that he has “*never* heard of a anode to cathode filament voltage over 100 volts, let alone 2000 volts” [emphasis in original], applicant is reminded that attorney arguments are not evidence and cannot take place of evidence in the record; an assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness. MPEP 2145. Item 9 of the declaration submits that Ceasar would be incapable of operating with ion energies of 50 eV or less due to instability that is found when the beam supply voltage approaches the discharge voltage, however, no factual evidence in support thereof other than this line of argument is present in the record. Notwithstanding, should applicant persist with this reasoning, an argument that an anode to cathode filament voltage is not possible over 100 volts would be considered to further teach the prior art’s disposition towards the claimed range of “about 50 eV or less”. As to Ceasar confusing the anode to cathode potential with that of the anode to ground potential, this

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line of reasoning is not persuasive in view of the mode of operation of an ion source known to be between the anode and cathode, that is, it is unclear as to why Ceasar would be concerned with this potential difference of 50 to about 2000 volts being relative to ground.

Applicant submits that King is referring to deposition on substrate 5 and not sputtering from target 4 as to the disclosed 20-30 eV range relied upon by the examiner as the threshold level for the onset of sputtering to occur. However, a closer review of the relevant portions of King (col. 4 line 58-64) clearly delineates that this energy level is to the “incoming ion” energy which “penetrate a significant distance into the bulk material”, the bulk material naturally being the substrate. The incoming ions, of course, originate from the target 4 as the sputtered target material travels towards the substrate 5.

Item 13 submits that Fu et al. refers to a fundamentally different art than sputtering by direct ion beams. In reply, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Fu et al. is clearly in the field of applicant's endeavor insofar as the patentees' disclosure is directed to ion sputtering of a target material.

Items 14-19 appear to be the same arguments presented above against Quazi, Arnold et al. and the *Ion Beam Neutralization* technical disclosure, and appear to be directed solely to these references failing to remedy alleged differences between Ceasar et al. and the presently claimed invention. However, Ceasar et al. in view of Fu et al. and as evidenced by King is maintained

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for the reasons of record and the combined teachings are believed to teach or at least suggest the presently claimed invention, thereby negating any alleged differences.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian A. Mercado whose telephone number is (703) 305-0511. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



am

February 21, 2003



Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700